



FIG. 1.

#### References

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 JONES (M. P.), 1965. Min. Mag., vol. 35, p. 536.

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### *Computer programmes for the calculation of Niggli values, C.I.P.W. norms, and variation diagram data*

A SET of programmes for the calculation of Niggli values, the C.I.P.W. norm, and variation diagram data have been written in Fortran II.

Descriptions of programmes for the Barth mesonorm and mineral unit cell contents have already been published (Morgan, 1965 and 1967). In the three programmes mentioned here, the following oxides are handled:  $\text{SiO}_2$ ,  $\text{TiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{FeO}$ ,  $\text{MnO}$ ,  $\text{MgO}$ ,  $\text{CaO}$ ,  $\text{Na}_2\text{O}$ ,  $\text{K}_2\text{O}$ ,  $\text{P}_2\text{O}_5$ ,  $\text{H}_2\text{O}(+)$ ,  $\text{H}_2\text{O}(-)$ ,  $\text{CO}_2$ . Input and output data are on punched cards.

The variation diagram programme is designed to compute chemical data for rock variation diagrams. It is by no means exhaustive, and can be expanded at will to suit the operator's needs. At present, the programme will calculate data for the following diagrams:

$\text{SiO}_2$ : alkalis, FMA ( $\text{Fe}_2\text{O}_3$  recalculated as  $\text{FeO}$ ),  
 $\text{K}_2\text{O}$ :  $\text{Na}_2\text{O}$ :  $\text{CaO}$ ,  $\text{Na}_2\text{O}$ :  $\text{K}_2\text{O}$ :  $\text{MgO}$ , felsic index,  
 mafic index,  $\text{SiO}_2$ :  $(\text{FeO} + \text{Fe}_2\text{O}_3)/(\text{FeO} + \text{Fe}_2\text{O}_3 + \text{MgO})$ ,  
 $\frac{1}{3} \text{SiO}_2 + \text{K}_2\text{O} - \text{FeO} - \text{MgO} - \text{CaO}$ ,  $(\text{Al}_2\text{O}_3/\text{SiO}_2)/\text{MgO}$ .

Kuno's Solidification Index can be read from the value of M in the FMA results.

All three programmes are available separately or together as printed listings from the author.

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#### *References*

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